

REMARKS

Claims 1-43 are pending. Of those, claims 1, 24, 32 and 39 are independent.

Initial Forms PTO-1449

On October 30, 2001, Applicant submitted an IDS. At this time, Applicant has not received copies of the initialed Forms PTO-1449 associated with the IDS. Accordingly, Applicant requests copies of the initialed Forms PTO-1449 as confirmation that the references cited therein have been made of record.

Drawing Objection

On page 2 of the Office Action, the Examiner has objected to Figure 8 regarding item numbers 814, 816 and 820-832.¹

More particularly, the Examiner has objected under 37 C.F.R. §1.84(p)(4), which requires that the same item appearing in two figures be identified with the same item number and that the same item number not be used for different items. Applicant does not understand how this applies to Fig. 8.

Fig. 8 depicts an example data communications network 800, according to an embodiment of the present invention. Network 800 can include one or more hosts or servers, e.g., server 814 and server 816. Network 800 further can include a pool of storage devices, e.g., disk arrays 820-832. Applicant submits that Fig. 8 does not violate Rule 1.84(p)(4).

For the reasons given above, Applicant requests withdrawal of the drawing objection. Alternatively, requests a clarified explanation of the drawing objection.

¹ The first sentence of the rejection lists the number of the patent to Shrivastava et al. as 6,606,643, which is actually the number of the patent to Emens et al.; see the form PTO-892 attached to the Office Action. Applicant infers that the Examiner intended instead to list the number "6,449,734".

§102 Rejection

Beginning on page 3 of the Office Action, claims 1-4, 7-9, 11, 12, 17-22, 24, 32 and 39 are rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,449,734 to Shrivastava et al. (the '734 patent). Applicant traverses

The '734 patent is directed toward a method and system for discarding locally-committed transactions in order to ensure consistency in a server cluster. What is a server cluster? A server cluster is a group of at least two independent servers connected by a network and managed as a single system; see lines 12-16 of column 1 of the '734 patent. Grouping several server computers into a single unified cluster makes it possible to share a computing load without users or administrators needing to know that more than one server is involved. This is a type of parallel redundancy which happens to be invisible outside the cluster.

Servers that comprise a cluster are referred to as nodes. Fig. 2A of the '734 patent depicts a cluster 58 that includes nodes 60₁, 60₂, 60₃, 60₄, ... and 60_n; see line 52 of column 4 to line 3 of column 5. Each of the nodes 60_i is a personal computer 20; see Fig. 1. Cluster resources include physical hardware devices such as disc drives and network carts, and logical items such as Internet Protocol (IP) addresses, applications and application databases. Each node in a cluster will have its own local resources. A cluster will also have common resources, such as a common data storage array (57 of Fig. 1) and a private cluster network. The common resources are accessible by each node in the cluster. Data for an application served by cluster 58 is stored on storage device 57.

Each node 60_i of cluster 58 maintains a cached copy of the application data in its own local resources, e.g., program data 38 within volatile memory 22 or program data 38 within non-volatile memory 27 of Fig. 1. Because nodes 60_i of cluster 58 represent parallel redundancy, it is important to maintain consistency among the nodes. As stated in lines 41-50 of column 1 of the '734 patent:

While clustering is thus desirable in many situations, problems arise if the servers (nodes) of the cluster become inconsistent with one another with respect to certain persistent cluster information. For example, memory state information, properties of the cluster or its resources and/or the state and existence of components in the cluster need to be consistent among the cluster's nodes. A global update protocol is used to ensure consistency of updates to this persistent state.

In particular, it is important to maintain consistency with respect to the primary copy of the application on data storage device 57 among the respective cached copies maintained within memories 22_i and 27_i.

The Examiner has asserted that lines 9-16 of column 7 and line 63 of column 7 to line 11 of column 8 correspond in claim 1 to the element "establishing at least one connection between a local storage server and a mirror storage server." Applicant traverses. For convenience, Applicant reprints the passages cited by the Examiner. Lines 9-16 of column 7 state:

With GLUP, a node (e.g., 60₂) wishing to send an update to other nodes first sends a request in the locker node 60₁. When any preceding updates are complete, the locker node 60₁ gives permission for this "sender" node 60₂ to broadcast its update to the other nodes in the system. In accordance with GLUP, the sender node sends the updates, one at a time, to the other nodes in a predetermined GLUP order that is ordinarily based on the unique number assigned to each node.

Also, line 63 of column 7 to line 11 of column 8 states:

To prevent multiple nodes from simultaneously modifying a set of resources or group, a "master" node is provided to serialize the transaction. Only the master node initiates the replication of a transaction at the locker node and acts as the sender node to replicate the transaction. Thus, a "requester" node that wishes to replicate modifications made to some set of resources can only do so by first forwarding the requested transaction to the master node. Preferably, the master node is the node that owns a resource or group (as described) above) on which the transaction is being requested. Of course, other mechanisms for determining which node will be a master for a given transaction are feasible. In any event, the use of a single master node for each resource or

group prevents two nodes from simultaneously modifying the state of a resource or set of resources. The single master thus ensures isolated operation.

The cited passages concern the sending of an update from one of the nodes to the other nodes, which implies the making of connections between the various nodes. The Examiner's interpretation of the cited passages treats a first node, e.g., 60₁, of cluster 58 as corresponding to a local storage server and a second node, e.g., 60₂, of cluster 58 as corresponding to a mirror storage server.

A local storage server and a mirror storage server perform different roles. In contrast, the roles performed by nodes 60₁ and 60₂ of cluster 58 are, in essence, interchangeable or fungible. Hence, it is unreasonable to interpret the '734 patent as disclosing a local storage server and a remote storage server.

More particularly, it is unreasonable to interpret node 60₂ as storing a mirror of the data stored on node 60₁. Rather, each of nodes 60₁ and 60₂ maintain their own cash copies of data stored on the common resource represented by storage device 57. Moreover, an update sent from node 60₁ to node 60₂ cannot be considered a mirror storage request that corresponds to a primary storage request received (by node 60₁) from a network host (which would be external to cluster 58).

The foregoing discussion has explained a distinction of claim 1 over the '734 patent. Claims 2-4, 7-9 and 17-22 depend at least indirectly from claim 1 and similarly distinguish over the '734 patent, at least by dependency.

Independent claims 24, 32 and 39 similarly concern mirroring of data on a local storage server and a remote storage server. Accordingly, claims 24, 32 and 39 distinguish over the '734 patent for reasoning similar to that explained above regarding claim 1.

For the reasons given above, the §102(e) rejection is improper and Applicant requests that it be withdrawn.

§103 Rejections

Beginning on page 10 of the Office Action, claims 5, 6 10 and 13-16 are rejected under 35 U.S.C. §103(a) as being unpatentable over the '743 patent in view of U.S. Patent No. 6,606,643 to Emens et al. (the '643 patent). Applicants traverses.

On page 14, claim 23 is rejected under §103(a) as being obvious over the combination of the '734 and the '643 patents in further combination with U.S. Patent No. 6,633,587 to Bennett (the '587 patent).

Also on page 14, under item 7, there is the following statement: "Claims 25-31, 33-38 and 40-43 do not teach or define any limitation over claims 1-24 and therefore are rejected for similar reasons." Applicant infers that claims 25-31, 33-38 and 40-43 are being rejected under §103(a) as being obvious over the '734 patent, but it is not clear to Applicant whether it is based upon the '734 taken alone or in combination with one of the other applied patents.

Applicant traverses the various rejections under §103(a). A distinction over the '734 patent have been noted above in the traversal of the §102(e) rejection. Neither of the '643 patent nor the '587 patent makes up for the deficiencies in the '734 patent. Accordingly, the distinction over the '734 patent also represents a distinction over each of the '643 and '587 patents.

In view of the foregoing discussion, withdrawal of the various rejections under §103(a) of claims 5-6, 10, 13-16, 23, 25-31, 33-38 and 40-43 is requested.

CONCLUSION

The issues in the case are considered to be resolved. Accordingly, Applicants again request a Notice of Allowability.


Person to Contact

In the event that any matters remain at issue in the application, the Examiners are invited to contact the undersigned at (703) 668-8000 in the Northern Virginia area, for the purpose of a telephonic interview.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 08-2025 for any additional fees under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,
Nicos A. Vekiarides

By:



Thomas S. Auchterlonie
Reg. No. 37,275

HARNES, DICKEY & PIERCE, P.L.C.
P.O. Box 8910
Reston, VA 20195
(703) 668-8000

TSA:dg:tta